March 16, 1954

Mr. W. B. Allred, Assistant Director
Division of Biology and Medicine
Atomic Energy Commission
Oak Ridge, Tennessee

Dear Mr. Allred:

Through an oversight in this office you have not previously been notified of the appointment of Dr. Clifford K. Beck as Director of the Raleigh Reactor and of Dr. Raymond L. Murray as Deputy Director. These appointments were effective September 1, 1953, and are to be continuous.

I wish also to express our gratitude to the Atomic Energy Commission for having made it possible for North Carolina State College to have this Reactor and for your continued cooperation in operating it to our mutual advantage. We regard the Reactor as presenting to us an unusual opportunity to be of service to our country and shall utilize its possibilities to the greatest possible advantage.

We are confident that Drs. Beck and Murray will provide leadership of great vision and that the Reactor will be operated in a manner which will be eminently satisfactory to the Atomic Energy Commission and North Carolina State College.

Sincerely yours,

Carey H. Bostian
Chancellor

CHB:H
cc: Dean J. H. Lampe
Dr. Clifford Beck

Bostian

NORTH CAROLINA STATE COLLEGE
OF THE
UNIVERSITY OF NORTH CAROLINA
RALEIGH

DEPARTMENT
OF
CHEMICAL ENGINEERING

June 16, 1954

Mr. Philip M. Frazier
Field Representative (Southern Area)
Radiological Safety Branch
Isotopes Division
United States Atomic Energy Commission
Oak Ridge, Tennessee

COPY

Dear Mr. Frazier:

In accordance with your letter dated May 18, 1954, we are supplementing our request of May 7 for renewal of our General Authorization by preparing these statements.

1. Three copies of Forms AEC-313 and 313a have been completed and are submitted with this letter.

2. Your specific questions are answered as follows: (refer to your letter of May 18, 1954)

   (a) The membership of our present Committee has consisted of various selections of the following men. A brief resume of their professional background related to radioactivity is provided.

   Dr. Cornelius G. Brennecke, Chairman.
   Professor, and Head of Department of Electrical Engineering. Has served four years on this Committee and its predecessor. In addition, served three years as the North Carolina State College representative with the Oak Ridge Institute for Nuclear Studies.

   Dr. F. Philips Pike, Vice-Chairman.
   Professor of Chemical Engineering. Served five months with ORNL as a Research Participant, working with processes dealing with the separation and purification of radioactive by-products of nuclear fission.

   Dr. Clifford K. Beck.
   Professor, and Head of the Department of Physics. Considerable experience on the Manhattan project, and at K-25 (Oak Ridge) with uranium accumulations and radiation experiments. Director of the North Carolina Nuclear Reactor.

   Dr. James H. Jensen.
   Professor, and Head of Plant Pathology Faculty. Eighteen months experience with the AEC in charge of radiation experiments.

Dr. Raymond L. Murray.
Professor of Physics. Experience with the AEC and at Oak Ridge, with criticality experimentation and radiation experiments. Consultant on reactor designs. Deputy Director of the North Carolina State College Nuclear Reactor.

Dr. Arthur C. Menius, Jr.
Professor of Physics. Consultant on reactor design and radiation experiments. Has directed experiments using radioisotopes.

Dr. Nathan S. Hall.
Professor of Agronomy. Experience both at the Department of Agronomy Laboratories at Beltsville, Maryland, and at N. C. State College with isotope experiments and the radiation problems involved.

Dr. Walter J. Peterson.
Professor, and Head of the Department of Chemistry. No direct experience with radiation problems. Since 1948, has served on committees and as an administrator in connection with projects involving radioactivity.

Mr. Charles Smallwood, Jr.
Associate Professor of Civil Engineering. Experience with the pollution and decontamination aspects of water and sewage systems, and radiation experiments in connection with these problems.

The previous Radioisotopes Committee, which had served for several years, was replaced on July 30, 1953, with essentially the present Committee. The changes served to broaden the representation with respect to our various College groups, and at the same time the scope of the Committee's function was increased to include educational and other responsibilities. The title of the Radioisotopes Committee was changed to the Committee on Safety and Health for the Nuclear Reactor and Radioisotopes.

The Committee as of July 30 did not include Dr. Peterson. Dr. James Jensen resigned his position at North Carolina State College as of November 1, 1953. Dr. Peterson, who replaced him, started his service on September 1, 1953.

The Chairman of this Committee has been Dr. C. G. Brennecke. Since early this year, Dr. Brennecke has been seriously ill. On April 2, 1953, Dr. F. P. Pike was elected Vice-Chairman, with the approval of the Administration. On May 6, Dr. C. K. Beck became the Alternate Vice-Chairman, but on June 4, he requested relief from this responsibility.

These are the circumstances related to our Radiological Safety Officer. This Officer is a full-time college employee answering directly to the Committee. During the past year, this position

was filled by Mr. Aaron Sanders until December 1, 1953, at which time Mr. Sanders took another position with the nearby Duke Hospital. From December 1, 1953 to January 1, 1954, the function of the R. S. O. was performed by Mr. Sanders on a part-time and consultant basis, upon call. During that month he spent one-fourth of his full time on this campus as our R. S. O. Since January 1, 1954, our R. S. O. has been Mr. David O. Lintz, who came to us from Oak Ridge well-qualified and well-recommended. An information sheet concerning Mr. David O. Lintz is attached.

(b) The present committee has held 20 meetings since its formation on July 30, 1953, and has acted upon 16 proposals. The previous committee enacted no business during the period July 1 to July 30, 1953.

(c) The shipments of isotopes during the past year, under our General Authorization, are presented in this table.

Isotope	Total Activity	Shipments
C 14	0.1 millicuries	1
P 32	375 "	4
S 35	61 "	2
K 42	260 "	2
Co 60	540 "	3
Sr 89	45 "	3
Mo 99	46 "	1
Ce 137	2 "	1
Au 198	50 "	1
	1379 millicuries	17

(d) There have been no major changes in laboratory facilities or equipment for handling radioisotopes during the past year.

(e) There have been no major changes in the facilities or equipment available for handling radioisotope during the past year. However, orders have been placed for additional instruments, totalling about $3500, for use by the R. S. O. in monitoring. The major items have not yet been received.

(f) There have been no major spills or other accidents with radioactive materials during the past year. The few incidents that did occur were very minor.

(g) Our personnel monitoring devices have not shown that any person has received an overexposure to radiation (greater than 300 mr in any one week) during the past year.

(h) We have not experienced any appreciable difficulty during the past year in the use of our General Authorization. If it can be said that a difficulty existed, it was in regard to the dessimination of knowledge of procedures and safeguards. The committee made a compilation and revision of its procedures, and regulations, and other information, and distributed it widely on a trial basis. It is expected that continued experience with our procedures and regulations will reveal any troublesome features.

In regard to your statements concerning future limitations on Strontium 90, and upon quantities above one curie, we do not anticipate any desire on our part for operations outside of these restrictions.

Very truly yours,

F. Philips Pike

F. Philips Pike, Vice-Chairman
Committee on Safety and Health for the
Nuclear Reactor and Radioisotopes

FPP/c

cc: Chancellor C. H. Bostian

Because of the illness of Dr. C. G. Brennecke, currently chairman of our Committee on Safety and Health for the Nuclear Reactor and Radioisotopes, Professor F. Philips Pike, currently vice-chairman of the committee, is hereby authorized to act on behalf of the College in the procurement of radioisotopes and in other matters related to radiological safety.

Carey H. Bostian

June 21, 1954

Carey H. Bostian
Chancellor, North Carolina State College

Form AEC-313
(Rev. March 1951)
B. B. No. 38-R027.1.

APPLICATION FOR RADIOISOTOPE PROCUREMENT

FOLLOW ATTACHED INSTRUCTIONS

LEAVE BLANK

TO: U. S. ATOMIC ENERGY COMMISSION, POST OFFICE BOX E, OAK RIDGE, TENNESSEE; ATTENTION: ISOTOPES DIVISION

1. NAME AND ADDRESS OF APPLICANT (*Institution, Firm, etc. Follow Instruction No. 2A*)
North Carolina State College (a unit of The Consolidated University of North Carolina)

2. DEPARTMENT TO USE ISOTOPE (*Follow Instruction No. 2B*)
Any part of N.C.State

3. NAME AND ADDRESS OF INDIVIDUAL USER (*Follow Instruction No. 3A*)
Users are authorized by the Committee on Safety and Health, etc.

4. EXPERIENCE OF THE USER (*Follow Instruction No. 3B*)
As required by the Committee on Safety and Health, etc.

RADIOISOTOPE REQUESTED (*Follow Instruction No. 4*)

5. ISOTOPE (*Element and mass number*)	6. CHEMICAL FORM	7. QUANTITY (*Millicuries or irradiated units*)	8. OTHER SPECIFICATIONS
As authorized by AEC	any	Less than one curie per shipment	None

9. ITEM NO. (*If any*) IN U. S. AEC CATALOG	10. NAME AND ADDRESS OF SUPPLIER, IF KNOWN
any	any

STATEMENT OF USE (*Follow Instruction No. 5*)

11. STATE PROPOSED USE OF RADIOMATERIAL AND GENERAL PLAN OF INVESTIGATION

A General Authorization is requested for North Carolina State College, thru its Committee on Safety and Health for the Nuclear Reactor and Radioisotopes, to approve applicants, users, quantities and procedures for experimentation with radioisotopes and radioactive sources, within limits.

12. WILL THE RADIOISOTOPE BE USED IN HUMAN BEINGS? (*Follow Instruction No. 6A*) CIRCLE YOUR ANSWER — YES (NO)

13. A. HUMAN DOSAGE (*In millicuries per patient*)	B. NUMBER OF DOSES (*Per patient*)	C. NUMBER AND TYPE OF PATIENTS	D. COMPOUND ADMINISTERED	E. SAMPLE TO BE TAKEN FOR MEASUREMENT
None	None	None	None	None

14. APPROVAL OF THE USER'S LOCAL ISOTOPE COMMITTEE (*Follow Instruction No. 6B*)
"THE LOCAL ISOTOPE COMMITTEE APPROVES THE HUMAN USE AS INDICATED IN ITEMS 11–13."

H. Philips, Pike
(Signature of Chairman, Local Isotope Committee)
Vice-Chairman

15. WILL THE RADIOISOTOPE BE USED IN LOWER ANIMALS? CIRCLE YOUR ANSWER — (YES) NO

16. IS A COMPLETED FORM AEC-313A A PART OF THIS APPLICATION? (*Follow Instruction No. 7*) CIRCLE YOUR ANSWER — (YES) NO

17. MAY THE ISOTOPES DIVISION RELEASE GENERAL INFORMATION REGARDING MATERIAL USED AND PURPOSE?
(*If your answer is "No," please state your reason here*)
CIRCLE YOUR ANSWER — (YES) NO

READ THE TERMS AND CONDITIONS ON THE BACK OF THIS SHEET AND SIGN THE CERTIFICATE THAT FOLLOWS—AN UNSIGNED APPLICATION CANNOT BE CONSIDERED

16—57264-4

Form AEC-313a
(Rev. March 1951)
B. B. No. 38-R027.1.

APPLICATION FOR RADIOISOTOPE PROCUREMENT

PART TWO
PAGE 1 OF 2 PAGES

STATEMENT OF FACILITIES FOR RADIATION MEASUREMENT AND HEALTH SAFETY MONITORING

Radioisotopes may be distributed only to applicants equipped to observe safety standards for the protection of health. This part of form AEC-313 must be completed in triplicate and **left attached to your first application.** *It may be* **detached** *from subsequent applications* **provided,** *there is no change in availability of the items listed.*

18. NAME AND ADDRESS OF APPLICANT (*Institution, Firm, etc.*)
North Carolina State College, thru its Committee on Safety and Health for the Nuclear Reactor and Radioisotopes.

19. DATE
June 1, 1954

20. NAME AND TITLE OF USER (*Same as item 3 above*)
As authorized by the Committee.

21. DEPARTMENT
As authorized by the Committee.

LIST OF RADIATION INSTRUMENTS AVAILABLE

	22. KIND OF INSTRUMENT	23. MAKE AND SERIAL NO.	24. SENSITIVITY RANGE (*Include window thickness in mg/cm²*)	25. USE (*Health monitoring or measurement*)
2	Beta-Gamma Survey Meter	Nuclear Inst. Serial No. 165	0.2 to 20 mr/hr G.M.tube	Health Monitoring
1	Alpha Survey Meter	Radioactive Products Samson Alpha Meter Model D-5	1.4 mg/cm² 0.500/2500/12500 C/m	"
1	Cutie Pie (β, γ) Survey Meter	Tracerlab Su.IE	0 to 2000 mr/hr	"
4	Jano Radiation Survey Meter	Nuclear Research Model SRJ-3	50 to 5000 mr/hr	"
1	γ-meter	Victoreen Condenser γ-meter, Model 70	0.25 to 250	"
1	Const. Rate Meter	Beckman, Model MX5	0.2 to 20 mr/hr	"
1	Ionization Chamber	Beckman, Model MX2	20 to 2000 mr/hr	"

Several scalers using both G. M. and Scintillator detectors are available for measurements.

26. HOW ARE INSTRUMENTS CALIBRATED?
Pertinent instruments will be compared with a calibrated Co-60 source.

27. HOW FREQUENTLY ARE INSTRUMENTS CALIBRATED?
Monthly

Form AEC-313a
(Rev. March 1951)
B. B. No. 38-R027.1.

APPLICATION FOR RADIOISOTOPE PROCUREMENT

PART TWO
PAGE 2 OF 2 PAGES

HEALTH PROTECTION AND MONITORING

28. DESCRIBE PROCEDURES PROPOSED FOR MONITORING AND HEALTH PROTECTION (*Particularly those special features pertinent to your work*)

All projects are monitored periodically by a full-time Radiological Safety Officer. We maintain the standards recommended by the National Committee on Radiation Protection, as presented in various handbooks issued by the National Bureau of Standards.

29. NAME AND TITLE OF PERSON TO WHOM RESPONSIBILITY FOR HEALTH PROTECTION WILL BE DELEGATED

Mr. David O. Lintz
Radiological Safety Officer

30. EXPERIENCE OF ABOVE PERSON (*Item 29*)

See attached sheets on David O. Lintz

MISCELLANEOUS EQUIPMENT FOR HEALTH PROTECTION

31. LIST AND DESCRIBE BRIEFLY (*Radiation, shielding, respirators, ventilated hoods, remote handling equipment, etc.*)

Lead bricks
Remote handling tongs
Rubber gloves
Stainless steel trays
Respirators
Ventilated hood
Remote pipets
Lead storage containers
Personnel monitoring devices

The necessary precautions prescribed in Handbook No. 42 are observed through use of the above facilities.

U. S. GOVERNMENT PRINTING OFFICE 16—57264-4

TERMS AND CONDITIONS

In consideration of the issuance of an authorization from the Commission to enable the applicant to procure or obtain the radioisotopes or irradiation service requested hereon, the applicant agrees that:

1. Radioisotopes purchased or acquired from the Commission or a distributor are shipped f. o. b. the laboratory, plant, facility, or Commission office handling the transaction, at prices and service fees as fixed by the Commission, and title to said materials, if same are not already owned by the applicant, shall pass to the applicant when the materials are delivered to the carrier. When shipment of the materials requires the use of returnable Government-owned containers, title to such containers shall remain in the Government and a deposit to insure return of the containers will be made if required. The applicant will keep the containers in good condition, will not use them for any materials other than the materials shipped therein, and will return them to point of shipment, transportation prepaid, within 21 days of date of shipment.

2. Neither the Government, the Commission, nor any distributor will be responsible for:

   (*a*) any damage to, destruction to, loss of, or changes in physical or chemical properties of materials of any kind accepted for a service irradiation, either as a result of, or in the process of, the irradiation or while said materials are in the possession of the Commission or a distributor;

   (*b*) any injury to persons or other living things or for damage to property caused by handling, shipment, use (including use based on any statement of quality or quantity), storage, transfer, disposal, or reshipment of, or other act or failure to act in connection with any materials purchased or acquired from the Commission or a distributor, or procured from any source upon the Commission's approval, it being expressly agreed that, as between the Commission, the supplying distributor, and the applicant, the applicant assumes complete responsibility and liability for any such injury or damage occurring: Provided, however, That if such injury or damage is caused solely by the negligent packing of the Commission or a distributor this assumption of liability shall not apply.

3. Neither the Government, the Commission, nor any distributor makes any warranty or other representation that (*a*) materials accepted for a service irradiation will not be destroyed, damaged, or otherwise altered in physical or chemical properties in the process of irradiation, and (*b*) radioisotopes (1) will not result in injury or damage when used for the purposes approved by the Commission, (2) will accomplish the results for which they are requested and approved by the Commission, (3) are safe for any other use, or (4) are of a particular quality or quantity. When procuring radioisotopes from the Commission or a distributor the applicant agrees to report promptly whether the amount received represents the amount paid for, in order that discrepancies may be adjusted.

4. Neither the Government, the Commission, nor any distributor shall be responsible, irrespective of cause, for the failure of the Commission, and distributor, or other transferor to (*a*) deliver radioisotopes at specified times, or (*b*) deliver radioisotopes of specified quality.

5. When materials supplied for a service irradiation are:

   (*a*) from an applicant not authorized to possess or use radioisotopes, the Commission or the distributor shall have the right to retain possession and control of the irradiated materials throughout the period of measurable activity of such materials, and unless otherwise stated in the request for service irradiation, may dispose of such materials in accordance with the usual Commission or distributor disposal procedures for radioactive materials;

   (*b*) to be tested or analyzed and retained by the Commission or a distributor, such materials may, unless otherwise stated in the request for service irradiation, be disposed of in accordance with the usual Commission or distributor disposal procedures for radioactive materials.

   It is expressly agreed that if any irradiated materials covered by (*a*) or (*b*) above must be retained by the Commission or a distributor in order to protect health and minimize other hazards to life or property, the applicant will pay all storage and maintenance charges connected therewith, and if any irradiated materials belonging to the applicant are disposed of under the provisions of this paragraph, the applicant shall have no claim for the value or replacement of said materials.

6. The Commission shall have the right to publish and use any information or knowledge acquired as a result of the irradiation of materials furnished by the applicant, including results of tests and analyses made for the applicant in connection with any such irradiated materials.

7. The right to revoke or cancel, with or without cause, arrangements for or agreements for the purchase or acquisition of any radioisotopes from a distributor, including arrangements or agreements for service irradiations, is reserved to the Commission. In the event the Commission revokes or cancels any arrangement or agreement for a service irradiation, the Government, the Commission, and the distributor shall be discharged of all obligations thereunder by return to the applicant of an amount of nonirradiated material of like kind, quality, and quantity as the material accepted for irradiation.

8. Title to and possession of all radioisotopes purchased or acquired from the Commission or from a distributor, or from any source on the authorization or approval of the Commission, remain subject to the Commission's statutory *right to recall*. Title to any materials recalled by the Commission shall vest in the Commission with the exercise of this right, and the Commission may enter and take possession of said materials any time after notice is given that the materials are being recalled: Provided, That if requested, the applicant, at his expense, will make shipment of the recalled materials to a destination designated by the Commission.

9. The applicant agrees to indemnify the Government, the Commission, their officers, agents, contractors, distributors, servants, and employees against liability, including costs and expenses incurred, for infringement of any Letters Patent occurring in the course of any service irradiation, test, or analysis performed for the applicant by the Commission or its distributors, or occurring in the utilization by the applicant of any radioisotopes or irradiated materials.

10. The applicant will furnish to the Isotopes Division six copies of each article published on the results of his investigations using radioisotopes or irradiation services, or will upon request furnish to the Isotopes Division a report of the results of his investigations.

11. Any radioisotopes received as a consequence of this application will be dealt with in accordance with all instructions, recommendations, or standards issued by the Commission for the safe use, handling, or disposal of radioactive materials.

12. All purchase orders and agreements for procuring radioisotopes are subject to the terms and conditions hereof and any contrary conditions of sale or transfer contained in such purchase orders or agreements will not apply.

CERTIFICATE

The applicant and any official executing this application in behalf of the applicant certify that the information stated herein is true and correct, that this application is made under and in conformity with Code of Federal Regulations, Title 10, Atomic Energy, Part 30, Radioisotope Distribution, and agree that this application and any materials procured pursuant thereto are subject to the terms and conditions on this page.

June 21, 1954
(Date)

Frederick Philip Pike
(Signature of Applicant or Certifying Official)

Vice-Chairman Committee
(Title)

WARNING

18 U. S. C., Sec. 1001; act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

16—57264-4

June 21, 1954

Mr. W. B. Allred, Chief
Reactor Branch
A. E. C.
Oak Ridge, Tennessee

Dear Mr. Allred:

Attached hereto are four copies of our report MCSC 73, "Revision of Reactor Components Policies and Procedures of Operations." It is intended that this report shall serve two purposes:

1) Inform you officially of certain revisions and adjustments in the mechanical features of our Nuclear Reactor as is required in our contract. We would interpret these changes described in the first section of the report to be relatively minor and in ~~either~~ each case to constitute an improvement in the operating convenience and safety of the reactor. The contract states that when such changes are made the AEC be informed, and we trust that this requirement is hereby fulfilled. If we can supply you with any further information we would be pleased to do so.
2) Submit to you information on reactor procedures which are stipulated in appendix A, item 1 (a) as a prerequisite to our operations at one kilowatt power level. We have completed the preliminary calibration adjustments and developments of procedures which were scheduled for the initial "low level" period of operation and are now ready to operate the reactor at levels ~~beyond~~ between 100 and 1000 watts.

During this period of operation we will continue the studies begun at low level operations on effectiveness of the shielding distribution of neutron fluxes and general reactor behavior. We will also be able to continue in a more effective way the experiments already initiated, and others can be started which utilize the reactor as a source of radiation.

If the requirements on procedures and the revisions of components covered are adequately in the attached report, and if the results of inspections of our reactor facilities which have been scheduled by different divisions of the AEC in recent days are adequate for operation up to 1000 watts, we request that permission for such operation be given. It is our belief and hope that this is so and trust that such permission can be granted no later than July 1, 1954.

Sincerely yours,

Clifford K. Beck, Head
Physics Department

CKB:nk
cc: Chancellor C. H. Bostian
Dean J. H. Lampe
F. T. Pike

Chancellor Bostian, this copy for your files

UNITED STATES
ATOMIC ENERGY COMMISSION

In Reply
Refer To: ORA:WBA

Oak Ridge, Tennessee
July 27, 1954

Dr. Clifford K. Beck
Department of Physics
School of Engineering
North Carolina State College
Raleigh, North Carolina

Subject: AMENDMENT TO THE STANDARDS OF OPERATION - RALEIGH RESEARCH REACTOR

Dear Dr. Beck:

Pursuant to your request to operate the Raleigh Research Reactor at power levels not greater than 1 KW and pursuant to compliance by the college of the "Instructions and Standards for Operation" and particularly Item 1 as set forth in our September 2, 1953 statement of orders, you were advised of Commission approval in my teletype of June 22, 1954.

You are hereby advised of the following additional operating instruction or order, which is designated as Item 10.

Item 10 - The reactor shall not be operated at power levels exceeding 1 KW.

Very truly yours,

Herman M. Roth

Herman M. Roth
Director
Research and Medicine Division

CC: T. H. Johnson, Washington
L. R. Hafstad "
S. R. Sapirie
N. H. Woodruff
J. R. Moore, Contract Div.
J. W. Ould, Legal

Allred:kl